NRAO eNews

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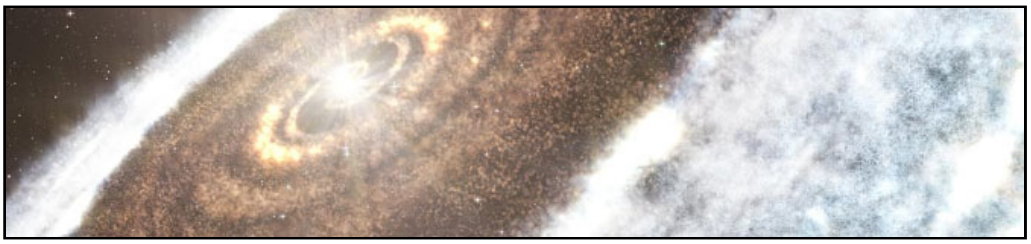


Upcoming Events

U.S. Radio/Millimeter/Submillimeter Science Futures II (http://go.nrao.edu/Futures2)
Aug 3 - 5, 2016 | Baltimore, MD

ALMA Future Science Development Program Workshop (https://science.nrao.edu/science/meetings/2016/na-alma-dev-program-workshop)
Aug 24 - 25, 2016 | Charlottesville, VA

Metrology and Control of Large Telescopes (http://go.nrao.edu/metconf)
Sep 19 - 24, 2016 | Green Bank, WV

Half a Decade of ALMA: Cosmic Dawns Transformed (http://go.nrao.edu/alma5years)
Sep 20 - 23, 2016 | Indian Wells, CA

Coexisting with Radio Frequency Interference (http://go.nrao.edu/rfi2016)
Oct 17 - 20, 2016 | Socorro, NM

ALMA Program News

Al Wootten

Announcements

ALMA reached a milestone on 30 June. This date, five years ago, was the deadline for the 1st ALMA Call for Proposals. Since then, 6662 ALMA proposals have been received, 1065 have been scheduled, and more than 900 have had some data delivered.

As recently announced by the Joint ALMA Observatory, new Science Verification targets that will demonstrate the Band 5 receivers are now listed on the Science Verification (https://almascience.nrao.edu/alma-data/science-verification/science-verification-wiki-info) web page.

Observations Status

ALMA has completed observing in configuration C40-4, the 40-antenna analog to C36-4, and has moved into configuration C40-5, for which the beam at 100 GHz is 0.54 arcsec for a maximum baseline of 1124m, as described in the Cycle 4 Technical Handbook. Weather at the site continues to present challenges. However, good observing efficiency has produced a backlog of projects in the pipeline. To address the backlog, the North American ALMA Science Center has assigned five data analysts to help in pipeline weblog reviews. As a result, the backlog is shrinking.

The ALMA Proposal Review Panels met 21 - 23 June in Vienna, Austria to rank the Cycle 4 proposals. Principal Investigators will be informed of the status of their proposals by August.

Up-coming Science Meetings

A conference titled *Half a Decade of ALMA: Cosmic Dawns Transformed* (http://go.nrao.edu/ALMA5years) will be held 20 - 23 September 2016 at the Renaissance Indian Wells Resort in Indian Wells, California, USA (near Palm Springs). This four-day international conference will highlight recent ALMA scientific results at the threshold of its fifth year of operation and bring together researchers from around the world to motivate collaborations for ALMA Cycle 5. Recently, ALMA imaged the the Sun-like star V883 Orionis, identifying the water snowline in its disk, where water condenses to form a layer of ice on dust grains and other particles – ices are sticky and promote further growth. With ALMA's spatial resolution of 20 milli-arcsec, a narrow dark annulus only 1 AU from TW Hya was recently revealed. ALMA has also observed the most distant oxygen known, made in the first stars. Though the ALMA archive has more than 500 ALMA datasets available, you do not need ALMA data to participate in the conference.

Early Registration at a reduced rate remains open until 1 August. Rooms booked at registration save an extra $50! The fee increases after 1 August, and registration closes 22 August. Students can register at any time before 23 August for a reduced rate.

Poster submissions are accepted through 1 August – these will be featured in short poster *flash talks* at the conference. A total of 149 oral presentation abstracts were received by the deadline, and the final schedule will be posted soon.

ALMA Future Science Development Program Workshop

Registration and abstract submission is open for a two-day ALMA Future Science Development Program Workshop (https://science.nrao.edu/science/meetings/2016/na-alma-dev-program-workshop) that will be held in Charlottesville, Virginia 24-25 August 2016. Abstract submission is also open.

The emphasis of this strategic Development Program Workshop – and subsequent Cycle 5 Call for Studies and Projects – will be on high-impact initiatives providing major advances in ALMA science through enhancements to sensitivity, instantaneous bandwidth and spectral coverage, spatial resolution, and imaging speed. An overview of the current ALMA Development Plan and its components will be featured at the Workshop. Remote participation will be available via video and audio links.

Contingent on federal funding, the annual ALMA Development Program budget for development studies and projects in North America is $4.5M USD. The Cycle 5 ALMA Development Program is expected to include an integrated, multi-year award pool for North American development studies and projects that may total up to $14M USD.

15th Synthesis Imaging Workshop

Amy Mioduszewski

Attendees at the 15th Synthesis Imaging Workshop

The 15th Synthesis Imaging Workshop was held 1-8 May 2016 in Socorro, New Mexico. Most of the workshop was held at the Workman Center on the campus of the New Mexico Institute of Mining and Technology (NMT). The data reduction tutorials were partially held at the NRAO Domenici Science Operations Center in Socorro. There were four days of lectures, two days of data reduction tutorials, and one afternoon of observation preparation tutorials. Other events included a

reception, workshop dinner, hikes of the Magdalena Mountains and the Bosque del Apache, and a popular tour of the Jansky Very Large Array (VLA).

There were 136 registered participants from 15 countries. Over half the participants were graduate students; scientific and engineering staff, postdocs, undergraduates, and faculty also attended.

The students spent one afternoon learning the important considerations for observing and how to prepare for VLA and Atacama Large Millimeter/submillimeter Array (ALMA) observations. There were also two full days of data reduction tutorials. Participants could choose tutorials using VLA, Very Long Baseline Array, Long Wavelength Array, and/or ALMA data. The datasets and a guide to reducing them via the Common Astronomy Software Applications (CASA) package are online (http://casaguides.nrao.edu/) .

Thirteen of the 25 lecturers were from NRAO. The other lecturers were from Naval Research Lab, the Netherlands's ASTRON, Harvard-Smithsonian Center for Astrophysics, New Mexico Tech, University of New Mexico, Texas Tech University, and the Air Force Research Lab. We thank all the lecturers for giving their time and talents to the workshop.

The Synthesis Imaging Workshop presentations (pdf format) and lectures (video) are available online. (https://science.nrao.edu/science/meetings/2016/15th-synthesis-imaging-workshop/lectures)

We thank NRAO and Associated Universities, Inc. for providing logistical and financial support and a majority of the lecturers. We are grateful to New Mexico Tech for providing the use of their facilities, and particularly the support of the Physics Department and the Academic Center for Technology, who recorded the lectures. We also thank the University of New Mexico and the New Mexico Consortium for their support.

GBT Remote Observing Training School

Toney Minter

The Green Bank Observatory will host two Green Bank Telescope (GBT) Observer Training Schools in the coming year. The first will be held 24-28 October 2016, and the second will take place 15-19 May 2017. Each of these schools will concentrate on pulsar and spectral line (low and high frequency) observing techniques with the GBT.

Attendees are expected to have prior basic knowledge of astronomy, radio astronomy, and radio astronomy observing. GBT scientists will present information on observing, calibration, and data reduction techniques with the GBT, as well as the writing of effective GBT observing scripts. Much of the workshop will involve hands-on training with the GBT and GBT data. Lectures and projects will be aimed at the graduate student level. Attendees completing the workshop should be ready for remote GBT observing.

If you would like to attend either of these training sessions, please contact Toney Minter (tminter AT nrao.edu) to reserve a space. These remote training sessions will be held in Green Bank, West Virginia and, due to the hands-on nature of the training, space is limited.

Who Is GBO? A Video Contest!

Karen O'Neil & Sherry McCarty

In 1956, the National Science Foundation decided to invest in a national observatory for radio astronomy, and Green Bank, West Virginia was selected as the site for this observatory. For more than 60 years, the radio-

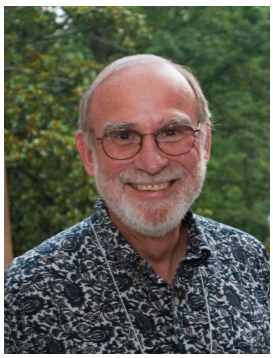
wavelength astronomical research facilities in Green Bank have been at the forefront of the quest to understand the Universe. And a vitally important part of this quest has always been the people who work, live, and learn here. What does the observatory mean to you?

On 8 October 2016, we will usher in a new era and will become the Green Bank Observatory. We would like you to be a part of it. Have you participated in a workshop, taken our tour, built ground-breaking receivers, or observed the Milky Way for the first time under our dark skies? If so, you are a part of the Green Bank Observatory community and we want to hear from you! Submit a brief video (90 seconds or less) and be entered to win VIP entry to the Green Bank Observatory Inaugural celebration!

Please visit our event website (http://www.greenbankobservatory.org/WhoIsGBO.html) for more information and directions on how to enter.

Robert L. Brown Outstanding Doctoral Thesis Award

Ken Kellermann



The Robert L. Brown Outstanding Doctoral Dissertation Award is administered by Associated Universities Inc. (AUI) and the National Radio Astronomy Observatory (NRAO) on behalf of Bob Brown's friends and family to honor Bob's life and career. The Award is given each year to a recent recipient of a doctoral degree from any recognized degree granting institution in the United States, whose doctoral thesis is substantially based on new observational data obtained at an AUI facility and considered to be of an exceptionally high scientific standard.

Award

The Award is available to degree recipients of any nationality and consists of $1000 USD, a framed certificate, and an invitation to give a colloquium at the NRAO.

Application Guidelines

To be eligible, the applicant must have successfully defended the thesis during the calendar year of the Award. The deadline for receipt of applications and supporting materials for the 2016 Award is 31 December 2016.

Applicants should send an e-mail describing their dissertation, the date of their successful thesis defense, the date of the degree award, and the name and contact information of the primary thesis supervisor to RLBrownAward@nrao.edu (mailto:RLBrownAward@nrao.edu) .

A copy of the thesis as a pdf file should be sent via e-mail to the same address or made available via a link given in the e-mail. Published papers or papers in press, or portions thereof, based substantially on the dissertation should accompany the application or made available via a link given in the e-mail. Verification of the successful thesis defense and statement that the applicant has successfully completed all university requirements for the Ph.D. should be sent directly by the appropriate university authority to RLBrownAward@nrao.edu (mailto:RLBrownAward@nrao.edu) .

Selection

The winning applicant will be selected by a committee appointed by the NRAO Director. If, in the opinion of the committee, in any given year none of the theses are sufficiently meritorious, the award will not be given in that year.

Questions should be addressed to RLBrownAward@nrao.edu (mailto:RLBrownAward@nrao.edu) .

Recent Media Releases

Stellar Outburst Brings Water Snowline into View (https://public.nrao.edu/news/pressreleases/2016-alma-water-snowline)
13 Jul 2016

NRAO Media Tip Sheet -- July (https://public.nrao.edu/news/tip-sheets/2016-july-tip-sheet)
01 Jul 2016

ALMA Board Approves Band 1 Receivers (https://public.nrao.edu/news/announcements/nrao16cb01-band1-alma)
23 Jun 2016

ALMA Sounds, an Interactive Project to Search for a Common Cosmic Language (https://public.nrao.edu/news/announcements/2016-alma-sounds)
17 Jun 2016

ALMA Observes Most Distant Oxygen Ever (https://public.nrao.edu/news/pressreleases/2016-distant-oxygen-alma)
16 Jun 2016

First Detection of Methyl Alcohol in a Planet-forming Disk (https://public.nrao.edu/news/announcements/2016-methanol-alma)
15 Jun 2016

Life's First Handshake: Chiral Molecule Detected in Interstellar Space (https://public.nrao.edu/news/pressreleases/2016-chiral-gbt)
14 Jun 2016

Career Opportunities

Assistant Scientist: (https://cw.na1.hgncloud.com/nrao/loadJobPostingDetails.do?jobPostingID=102900&source=jobList) The NRAO is actively seeking an Assistant Scientist who will work with the Algorithms R&D Group and the CASA group and will be expected to carry out research in developing algorithms relevant to the NRAO telescopes and their implementation, and to provide support and maintenance of the CASA package for delivery to the user community. The successful candidate will contribute to CASA development and maintenance as part of the CASA team. Work will require advanced programming in C++ and Python, use of the CASA package, and high performance computing. The position will be based in either Charlottesville, Virginia on the grounds of University of Virginia (http://www.virginia.edu/) or in Socorro, New Mexico on the campus of New Mexico Tech (http://www.nmt.edu/) .

Division Head - Electronics (https://cw.na1.hgncloud.com/nrao/loadJobPostingDetails.do?jobPostingID=102760&source=jobListr) **:** The NRAO in Green Bank, WV is actively seeking a Division Head for the Electronics Division. The successful candidate will become a member of the NRAO Green Bank Operations team that oversees the development and operation of the Robert C. Byrd Green Bank Telescope (GBT), the world's largest fully-steerable telescope, as well as numerous other smaller telescopes that are used for a variety

of scientific and educational purposes. Working at wavelengths ranging from 100cm through 3mm, the GBT supports a diverse portfolio of scientific research. The Electronics Division currently consists of 10 engineers and 9 technicians divided into two groups – microwave and digital, both of which have group leads. The Electronics Division Head is responsible for managing the Division as well as working with the other Division Heads in Green Bank to plan the future of the telescopes and facilities to optimize their scientific use.

Assistant Scientist: (https://cw.na1.hgncloud.com/nrao/loadJobPostingDetails.do?jobPostingID=102841&source=jobList) The NRAO is actively seeking an Assistant Scientist to be an active partner in working to increase communication between the Common Astronomy Software Applications (CASA) development team and the user community. The CASA package is the primary data reduction package for both the Karl G. Jansky Very Large Array (VLA) and Atacama Large Millimeter/submillimeter Array (ALMA), in addition to being used at other radio observatories around the world. It is expected that the successful candidate will conduct research using the CASA package. The position will be based in either Charlottesville, Virginia on the grounds of University of Virginia (http://www.virginia.edu/) or in Socorro, New Mexico on the campus of New Mexico Tech (http://www.nmt.edu/) .

Research Engineer in Millimeter and Submillimeter Wavelength Electronics: (https://cw.na1.hgncloud.com/nrao/loadJobPostingDetails.do?jobPostingID=102480&source=jobList) The NRAO in Charlottesville, Virginia invites applicants who are research engineers with expertise in millimeter/sub-millimeter wavelength electronics. The successful candidate will be a member of the NRAO Scientific Staff and will join the millimeter/sub-millimeter receiver group in the Central Development Laboratory (CDL) in Charlottesville, Virginia. She/he will play a leading role in a program of design and development of low-noise millimeter/sub-millimeter wavelength instrumentation for astrophysical observation. This has been identified by NRAO as a key technology area for the next generation of radio telescope instrumentation.

For additional information on these openings and other NRAO career opportunities, please visit the NRAO – Career Opportunities web pages (https://cw.na1.hgncloud.com/nrao/index.do) .

From the Archives

Ellen Bouton

About this month's photograph: Grote Reber built the first parabolic dish antenna in his backyard in Wheaton, Illinois in 1937 to follow up on Jansky's 1933 discovery of galactic radio emission, and in 1940 published the first papers reporting observations of galactic radio noise and the first map of the radio sky. Reber was also interested in a wide array of topics beyond radio astronomy. In addition to his radio astronomy papers, he also published research papers on Hawaiian meteorology, the age of lava flows on Haleakala, Hawaii, carbon dating of aboriginal kitchen middens in Tasmania, and reversed bean vines. Reber experimented with bean vines to determine whether manually reversing how the beans twined around their support would increase their yield. In 1959-60, Reber grew beans while in Green Bank to supervise the reconstruction of his Wheaton antenna at the NRAO entrance.

From the Archives is an ongoing series illustrating NRAO and U.S. radio astronomy history via images selected from our collections of individuals' and institutional papers. If readers have images they believe would be of interest to the Archives, please contact Ellen Bouton (#) .

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